Listing of Claims

1. (Previously resented) A method of artifact correction in a data set of an object of interest, the method comprising the step of: reconstructing an image of the object of interest on the basis of the data set; wherein a statistical weighing is performed during reconstruction of the image, wherein the reconstruction of the image is performed on the basis of an iterative algorithm comprising a plurality of update steps until an end criterion has been fulfilled, wherein each update step comprises subtractions weighted with an intrinsic statistical error σ_{Y_i} based on measured photon counts Y_i, wherein σ_{Y_i} is the square root of Y_i.

2. (Original) The method according to claim 1, wherein the data set is a projection data set acquired by means of a source of electromagnetic radiation generating a beam and by means of a radiation detector detecting the beam.

3. (Original) The method according to claim 2, wherein the source of electromagnetic radiation is a polychromatic x-ray source; wherein the source moves along a helical path around the object of interest; and wherein the beam has one of a cone beam geometry and a fan beam geometry.

4. (Cancelled)

5. (Previously presented) The method according to claim 1, wherein the iterative algorithm is a maximum likelihood algorithm; wherein the reconstructed image has the highest likelihood; and wherein the weighing is performed in each update step of the plurality of update steps.

6. (Original) The method according to claim 2, further comprising the step of: determining a number of detected photons during acquisition of the data set; wherein the weighing is based on a statistical error of the number of detected photons.

7. (Original) The method according to claim 5, further comprising the step of: determining a number of detected photons Y_i during acquisition of the data set; wherein the weighing is based on a statistical error σ_{Y_i} of the number of detected photons Y_i; wherein an update of an attenuation parameter μ_j^{n+1} is calculated from the attenuation parameter μ_j^n by

$$\mu_j^{n+1} = \mu_j^n + \mu_j^n \frac{\sum_i l_{ij} \frac{\sum_i l_{ij} \left[d_i e^{-<l_i, \mu^n>} - Y_i \right] / \sigma_{Y_i}^2}{\sum_i l_{ij} / \sigma_{Y_i}^2}}{\sum_i l_{ij} < l_i, \mu^n > d_i e^{-<l_i, \mu^n>}}$$

wherein d_i is a number of photons emitted by the source of radiation;
wherein l_{ij} is a basis function of an i-th projection;
wherein l_i is a vector of basis functions l_{ij} of the i-th projection; and
wherein $< l_i, \mu >= \sum_j l_{ij} \mu_j$ is an inner product.

8. (Original) The method according to claim 2, wherein the reconstruction of the image is based on a sub-set of at least two projections of all acquired projections of the projection data set.

9. (Previously presented) A data processing device, comprising: a memory for storing a data set of an object of interest; a data processor for performing artifact correction in the data set of the object of interest, wherein the data processor is adapted for performing the following operation: loading the data set; reconstructing an image of the object of interest on the basis of the data set; wherein a statistical weighing is performed during reconstruction of the image; wherein the weighing comprises an intrinsic statistical error σ_{Y_i} based on measured photon counts Y_i, where σ_{Y_i} is the square root of Y_i.

10. (Original) The data processing device according to claim 9, wherein the reconstruction of the image is performed on the basis of an iterative algorithm comprising a plurality of update steps until an end criterion has been fulfilled; wherein the iterative algorithm

is a maximum likelihood algorithm; wherein the reconstructed image has the highest likelihood; and wherein the weighing is performed in each update step of the plurality of update steps.

11. (Original) A CT scanner system, comprising: a memory for storing a data set of an object of interest; a data processor for performing artifact correction in the data set of the object of interest, wherein the data processor is adapted for performing the following operation: loading the data set; reconstructing an image of the object of interest on the basis of the data set; wherein a statistical weighing is performed during reconstruction of the image.

12. (Previously presented) An apparatus for performing artifact correction in a data set of an object of interest, comprising:

a processor; and

a computer readable storage medium encoded with computer executable instructions which, when executed by the processor, causes the processor to perform the following operation

loading the data set; and

reconstructing an image of the object of interest on the basis of the data set; wherein a statistical weighing is performed during reconstruction of the image; wherein the weighing comprises an intrinsic statistical error σ_{Y_i} based on measured photon counts Y_i, where σ_{Y_i} is the square root of Y_i.

13. (Previously presented) The method of claim 1, wherein the end criterion is met only when a difference between consecutive updates does not exceed a threshold value, wherein the threshold value is defined; wherein if the end criterion is not met a counter is increased by one and iterations continue.

14. (Previously presented) The CT scanner system of claim 11, wherein the CT scanner system is connected to a loudspeaker to automatically output an alarm.

15. (Previously presented) The apparatus of claim 12, wherein the apparatus is connected to a memory for storage of an image depicting an object of interest.

16. (Previously presented) The apparatus of claim 12, wherein the apparatus is connected to a plurality of input/output network and diagnostic devices for further analysis and display of stored data and information.

17. (Previously presented) The apparatus of claim 12, wherein the apparatus is further connected to a motion monitor which may monitor the physiological capacities of an object of interest.

18. (Previously presented) The apparatus according to claim 12, wherein the processor also determines a number of detected photons during acquisition of the data set.

19. (Previously presented) The apparatus of claim 12, wherein the processor further sets a set of attenuation parameters μ_j to an initial value, wherein each attenuation parameter μ_j belongs to a respective interval along a projection of an i-th projection.

20. (Previously presented) The apparatus of claim 12, wherein the processor further calculates the attenuation parameters μ_j by:

$$\mu_j^{n+1} = \mu_j^n + \mu_j^n \frac{\sum_i l_{ij} \dfrac{\sum_i l_{ij} \left[d_i e^{-<l_i,\mu^n>} - Y_i\right] / \sigma_{Y_i}^2}{\sum_i l_{ij} / \sigma_{Y_i}^2}}{\sum_i l_{ij} < l_i, \mu^n > d_i e^{-<l_i,\mu^n>}}$$

wherein d_i is a number of photons emitted by the source of radiation; wherein l_{ij} is a basis function of an i-th projection; wherein l_i is a vector of basis functions l_{ij} of the i-th projection; and wherein $< l_i, \mu >= \sum_j l_{ij} \mu_j$ is an inner product.

21. (Previously presented) The apparatus according to claim 12, wherein the reconstruction of the image is based on a sub-set of at least two projections of all acquired projections of the projection data set.